



MEMORANDUM

DATE: May 20, 1997

TO: Captain Timothy Hettrich  
Planning and Research Division  
San Francisco Police Department

FROM: Hilary Stoermer, CIH  
Industrial Hygienist

A handwritten signature, likely of Hilary Stoermer, consisting of stylized initials and a surname.

RE: **Revised Radiation Monitoring Results, Hunters Point Shipyard, Building 606**

Attached is a revised version of the above report that was originally submitted to you on May 12, 1997. Due to a clerical error on the table (Page 2), the information presented was incorrect. Please note that this attached version will supersede the May 12, 1997 version.

If you have any questions, please do not hesitate to contact me at 554-2651.

c: Chris Cunnie, President, Police Officers Association  
Cmdr. John Portoni, Police Department  
Michael Cohen, City Attorney  
✓ Byron Rhett, Redevelopment Agency  
Domenic Zigant, US Navy  
File: SFPD/Misc.



## MEMORANDUM

DATE: May 19, 1997

TO: Captain Timothy Hettrich  
Planning and Research Division  
San Francisco Police Department

FROM: Hilary Stoermer, CIH  
Industrial Hygienist

Handwritten signature of Hilary Stoermer.

THROUGH: Vickie L. Wells, CIH, CSP  
Director, Occupational Safety and Health Program

Handwritten signature of Vickie L. Wells.

RE: **Revised Radiation Monitoring Results, Hunters Point Shipyard, Building 606**

This revised memorandum summarizes results of radiation monitoring performed at Building 606 at the Hunters Point Shipyard (HPS). This monitoring was conducted as a result of concern expressed by onsite staff that known radiation contamination at Hunters Point Shipyard was presenting an exposure hazard to occupants of Building 606.

Background

The investigation of radiation sites at HPS by the US Navy has consisted of three phases. Phase I was a surface confirmation radiation survey conducted in 1991 that included air and soil sampling. At that time, the Navy found that radium-containing instruments had been buried in a landfill in Parcel E, northwest of Building 606. Note that the Navy also found elevated radiation levels in Parcel D, at an area just outside Building 364. However, this was attributed to a Cesium-137 spill and was remediated in 1996.

Phase II of the investigation consisted of determining the subsurface extent of the radiation in Parcel E. The radium dials were found to be located from the surface to 9 feet below ground.

The purpose of the Phase III investigation is to address radiological concerns regarding the former use, storage and disposal of radioactive materials associated with past operations. Specifically, several former buildings located directly southeast of Building 606 were used by the Navy Radiological Defense Laboratory (NRDL) as a laboratory and office space, and thus housed radioactive materials. These sites are now being investigated, and the results of that survey will be made available on May 29, 1997 as an appendix to the *Parcel E Remedial Investigation (RI) Draft Final Report*. We will review the report at that time and report our findings. At this time, no remedial work is being conducted at Hunters Point Shipyard that involves disturbance of radioactive materials.

Radium is a naturally occurring radioactive metal that is formed as a result of decay (breakdown) of uranium and thorium. This decaying process releases alpha and beta particles, and gamma radiation, all of which are capable of traveling different distances. Alpha particles can travel only a short distance, and cannot travel thorough the skin; beta particles can penetrate the skin, but can not pass through the entire body; and gamma radiation can go all the way through the body.

Radium has been used as a radiation source for treating disease, as a radon source, and prior to the 1960's as a component of luminous paints used for watch dials, compasses, and instrument panels. Radium is a human carcinogen, and sufficient exposure to radium may produce various types of cancer, particularly in the bones and nasal cavities.

#### Methodology

The purpose of our monitoring was to determine if the presence of radioactive materials at Hunters Point Shipyard was presenting a health hazard to occupants of Building 606. The monitoring was conducted using a direct-reading Victoreen Thyac V Survey Meter (Model 190). This is a portable, battery-operated meter for monitoring alpha, beta, x-ray and gamma ray emissions from ionizing radiation sources, and uses a pancake-type probe with a Geiger-Müller tube. Measurements were recorded on a data sheet (see attached) and were taken from both the air (at approximately five feet off the ground) and at floor level (where radioactive dust and/or particles would settle). Measurements taken at the floor level were generally located in areas with textured surfaces, such as carpet, where dirt and particulates would tend to accumulate, and thus represent "worst case". Control monitoring was also conducted at the Department of Public Health, 101 Grove Street, in order to establish a background level.

#### Exposure Limits

The California Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) has adopted the Federal regulatory standards for occupational exposure to ionizing radiation. Additionally, maximum permissible exposure level guidelines for ionizing radiation have been published by the National Council on Radiation Protection (NCRP). Radiation exposure is reported in units called "rem", which stands for Roentgen Equivalent Man. A rem is a unit of absorbed energy multiplied by a quality factor that takes into account the relative biological effect of the particular radiation on the body. The regulatory standards and some of these guidelines are presented below for comparative purposes:

Type of Exposure	Exposure Limit (in rem)	Exposure Limit (in mrem*)
<b>10 CFR Section 20.1201</b>		
Total dose, occupational	5 rems annually	5,000 mrems annually
Eye, occupational	15 rems annually	15,000 mrems annually
Skin or extremity, occupational	50 rems annually	50,000 mrems annually
<b>NCRP</b>		
Whole body, occupational	5 rems in any 1 year	5,000 mrems in any 1 year
Skin, occupational	15 rems in any 1 year	15,000 mrems in any 1 year
Hands, occupational	75 rems in any 1 year	75,000 mrems in any 1 year
Public, or occasionally exposed individuals.	0.5 rems in any 1 year	500 mrems in any 1 year
Students	0.1 rems in any 1 year	100 mrems in any 1 year

\* one-thousandth of a rem

Ionizing radiation exposure to humans does not only occur in occupational settings. Additional sources include natural or "background" radiation from various internal and external sources, medical irradiation, and environmental radiation from man-made sources:

- Background radiation includes naturally occurring radionuclides deposited within the body, and external sources such as cosmic radiation, and gamma radiation from materials naturally present in the ground. Background radiation levels will vary from one

geographical area to another and in building materials. Natural radiation in the United States results in an estimated average annual dose to individuals of about 125 mrem (one-thousandth of a rem)<sup>1</sup>. It is unlikely to be less than 100 mrem for any individual, and more than 400 mrem. Several sources reported average background levels of 300-350 mrem/year<sup>2</sup> and 200 mrem/year<sup>3</sup>.

- Medical diagnoses and therapeutic procedures involve external irradiation with beta, gamma or x radiation. Doses to individuals will vary but usually involve only partial body irradiation. Average annual doses to individuals from these sources has been estimated to be between 50 and 75 mrem per year<sup>4</sup>.
- Environmental radiation from man-made sources adds a small increment of dose to the population generally. These sources include fallout from nuclear weapons testing; effluents from nuclear and other facilities processing or using radionuclides; luminous dial clocks or watches and signs; and electronic devices. The average annual dose to an individual from these sources is estimated to be about five or six mrem per person, per year<sup>5</sup>.

### Results and Discussion

Radiation monitoring using the direct-reading instrument did not show radiation levels exceeding the background levels measured at 101 Grove Street. More specifically, radiation levels at Building 606 did not exceed 0.02 mrem per hour, while at 101 Grove Street, levels did not exceed 0.03 mrem per hour. Using the highest measured level of 0.02 mrem per hour at Building 606, we calculated that the "worst case" yearly exposure level is 175 mrem per year<sup>6</sup>. This allows us to compare this data to established guidelines and known background levels.

This calculated level of 175 mrem per year does not exceed any of the regulatory standards or NCRP guidelines, and is consistent with normal expected background levels. Therefore, we can conclude that the mere presence of radioactive materials at Hunters Point Shipyard is not presenting a health hazard to occupants of Building 606. However, should the Navy commence remediation which involved disturbance of radioactive materials, this assessment would no longer be valid.

Additionally, we will be reviewing the results of the US Navy's Phase III Radiological Survey when it becomes available on May 29, 1997. This investigation will be an appendix to the *Parcel E Remedial Investigation Draft Report*. This report will be available in the Main Branch of the San Francisco Public Library if you care to view it. Any pertinent information contained therein will be forwarded to you at that time.

If you have any questions, please do not hesitate to contact me at 554-2651.

- c: Chris Cunnie, President, Police Officers Association  
Cmdr. John Portoni, Police Department  
Michael Cohen, City Attorney  
✓ Byron Rhett, Redevelopment Agency  
Domenic Zigant, US Navy  
File: SFPD/Misc.

<sup>1</sup> The Industrial Environment-Its Evaluation and Control, NIOSH Publication No. 74-117, 1973.

<sup>2</sup> Personal Communication with Jerry Kunzman, Health Physicist at Los Alamos National Laboratory, April 29, 1997.

<sup>3</sup> Personal Communication with Dean Decker, Industrial Hygienist with the Department of Energy, April 29, 1997.

<sup>4</sup> The Industrial Environment-Its Evaluation and Control, NIOSH Publication No. 74-117, 1973.

<sup>5</sup> Ibid.

<sup>6</sup>  $(0.02 \text{ mrem/hour}) \times (24 \text{ hours}) \times (365 \text{ days}) = 175.2 \text{ mrem/year}$

## RADIATION SAMPLE DATA SHEET

Sampling Date: 4.28.97	Method: Victoreen 190 Rad Monitor
Site: 101 Carove Street	

Monitor ID.: 183		Probe ID: 139	
Location	A=Air F=Floor	Instrument Reading	Units
Room 217	A	10-20	mR/hr
	A	10-20	
	F	10-30	
	F	10-20	
	A	10-20	
	F	10-20	
	F	10-30	
	A	10-20	
	A	10-20	
Room 220	F	10-20	
	A	10-20	
	A	10-20	
	F	10-20	
	F	10-20	
Room 218	A	10-20	
	F	10-30	
	F	10-20	
	A	10-20	▽

Signature: <i>[Signature]</i>	Date: 4.28.97
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## RADIATION SAMPLE DATA SHEET

Sampling Date: <u>4-23-97</u>	Method: <u>Victoreen 190 Rad Monitor</u>
Site: <u>Building 606, Hunters Point Shipyard</u>	

Monitor ID: <u>183</u>		Probe ID: <u>139</u>	
Location	A=Air F=Floor	Instrument Reading	Units
<u>2/FL Lobby</u>	<u>A</u>	<u>&lt;20</u>	<u>uR/h</u>
<u>1/FL Lobby</u>	<u>A</u>	<u>&lt;20</u>	
<u>Bay</u>	<u>A</u>	<u>&lt;20</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>Outside, west side</u>	<u>A</u>	<u>&lt;20</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>Bay</u>	<u>A</u>	<u>&lt;30</u>	
<u>↓</u>	<u>↓</u>	<u>↓</u>	
<u>1/FL Crime Lab</u>	<u>A</u>	<u>&lt;20</u>	
<u>1/FL Crime Lab</u>	<u>F</u>	<u>&lt;20</u>	
<u>4/FL Lab hallway</u>	<u>A</u>	<u>&lt;20</u>	
<u>↓</u>	<u>F</u>	<u>&lt;20</u>	
<u>1/FL Lobby, carpet</u>	<u>F</u>	<u>&lt;20</u>	

Signature: <u>[Signature]</u>	Date: <u>4-23-97</u>
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## RADIATION SAMPLE DATA SHEET

Sampling Date: 4.23.97	Method: Victoreen 190 Rad-Monitor
Site: Hunters Point Shipyard, Bldg. 606	

Monitor ID.: 183		Probe ID: 139	
Location	A=Air F=Floor	Instrument Reading	Units
Soil, outside, west	F	<20	uR/hr
↓	↓	↓	
Tire, personal vehicle	F	<20	
Soil, outside, north	F	<20	
Soil, outside, east	F	<20	
Bay	A	<20	
↓	↓	↓	
Police vehicle tire, bay	F	<20	
Top of crane beam	F	<20	
2/FCL Lobby Floor	F	<20	
2/FCL Licut. office, carpet	F	<20	
2/FCL, Officer Berry's office carpet	F	<20	
Vacuum bag in	F	<20	
Vacuum & intake	F	<20	
Mop, in janitor's closet	F	<20	

Signature: <i>Kelley Stearns</i>	Date: 4.23.97
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